UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W.
ATLANTA, GEORGIA 30323

SEP 21 1988

Report No.: 50-400/88-24

Licensee: Carolina Power and Light Company
P. O. Box 1551
Raleigh, NC 27602

Docket No.: 50-400 License No.: NPF-63

Facility Name: Shearon Harris

Inspection Conducted: August 15-19, 1988

Inspector: Chark A Hughey Jr 9/20/88
C. A. Hughey Date Signed

Approved by: John B Kahle 9/20/88
J. B. Kahle, Section Chief Date Signed
Division of Radiation Safety and Safeguards

SUMMARY

Scope: This routine, unannounced inspection was conducted in the areas of liquid and gaseous effluents.

Results: In the areas inspected, violations or deviations were not identified. Inoperability of several liquid effluents radiation monitors and gaseous effluent flow measuring devices had kept the licensee in continuous ACTION statements of the Technical Specifications. The inspector encouraged the licensee to vigorously continue to work toward a permanent fix of these monitors.

The inspector concluded from discussion with plant personnel and a review of appropriate records that liquid and gaseous effluents for 1987 were within 10 CFR 50, Appendix I design objectives (ALARA), 40 CFR 190 dose limitations and the radiological effluent Technical Specifications.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

S. Adams, Senior Specialist, Enviromental and Chemistry (E&C)
S. Buch, Technician, E&C
D. Cahill, Senior Specialist, E&C
*C. Hinnant, Plant General Manager
H. Lipa, Supervisor, E&C
A. Padgett, Principal Health Physics Specialist
*A. Poland, Project Specialist, Radiation Control
*J. Sipp, Manager, Environmental and Radiation Control
F. Smith, Senior Engineer, Maintenance
*D. Tibbits, Director, Regulatory Compliance
*M. Wallace, Senior Specialist, Regulatory Compliance
*R. Watson, Vice President, Harris Nuclear Project

Other licensee employees contacted during this inspection included engineers, operators, security force members, technicians, and administrative personnel.

NRC Resident Inspectors

G. Maxwell
*M. Shannon

*Attended exit interview

2. Liquid and Gaseous Effluents (84723, 84724)

a. Semiannual Effluent Release Reports

The inspector reviewed selected portions of the Semiannual Radiological Effluent Release reports for the periods January 1 to June 30, 1987, and July 1 to December 31, 1987. This review included an examination of the liquid and gaseous release data during the first year of operation. This data is summarized in the Attachment to this report.

During 1987, no abnormal gaseous or liquid releases were reported.

Liquid and gaseous effluent levels appeared relatively low as compared to other plants in Region II. This could be attributable to Harris being a new unit in its first year of operation.

The inspector concluded from discussions with plant personnel and a review of the semiannual effluent reports that liquid and gaseous

effluents for 1987, were well within 10 CFR 50, Appendix I design objectives (ALARA), 40 CFR 190 dose limitations and the radiological effluent Technical Specifications.

b. Tours of Containment

Two tours of containment by the inspector indicated that the general area was relatively contamination free and general area dose rates appeared relatively low.

One problem area was noted. Crystallized boric acid was observed on and below a flow control valve (RC-103) from RCS loop 2 to the pressurizer spray. Reactor coolant had obviously leaked during power operations from RC-103, located at the top of the pressurizer vessel, down the side of an adjacent wall. This resulted in large deposits of crystallized boric acid on the outside of the valve, on electrical junction boxes located on the wall and in and on cable trays, various electrical cables and the floor around the bottom of the pressurizer vessel. This observation was brought to the attention of the licensee management. Management stated that corrective actions had been initiated to replace the packing in valve RC-103. The inspector verified that the work order had been initiated.

c. Process Radiation Monitor Calibrations

The following completed procedures for the primary calibration of process effluent monitors were reviewed with no items of concern noted.

- RST-011, Primary Calibration of the RD-53 Liquid Radiation Monitor, Review 3, August 21, 1986 (Monitor REM-21WS-3542, Secondary Waste Sample Tank Pump).

- RST-012, Primary Calibration of GA Technologies Gaseous Radiation Monitors, Revision 1, May 23, 1986 (Monitor RM-1WV-3547-01, Stack 5a Wide Range Gas Monitor).

d. Liquid Radwaste Effluent Monitors

Processed liquid wastes were being discharged normally from three tanks in the radwaste building. There was a liquid process radiation monitor for each tank. These three monitors had been declared inoperable by the licensee (REM-1WL-3540, REM-21WL-3541, and REM-21W5-3542).

During liquid discharges, contamination from the process stream appeared to accumulate within the sample chambers of the monitors. As this accumulation increased during discharges, radiation levels within the monitors subsequently increased eventually exceeding the

setpoint of the monitors (determined prior to the beginning of the discharge). This terminated the discharge (by design) prior to the completion of the discharge.

In order to prevent these spurious discharge terminations, the licensee had declared these monitors inoperable. This placed the licensee in a continuous ACTION statement of the Technical Specifications which required increased grab sampling and analysis. At the time of the inspection, the licensee was evaluating options for preventing contamination buildup within the sample chambers. This matter will be followed as an IFI (50-400/88-24-01).

e. Additional Dilution Water Flow

The inspector discussed with the licensee the addition of piping that would supply increased dilution water flow from Lake Harris to the circulating water blowdown system during liquid radwaste discharges. At the time of the inspection, the installation was nearing completion.

The main reason for addition of this line was to help conserve expensive water treatment chemicals used in the circulating water system. During liquid radwaste discharges, required dilution water was being normally provided by the circulating water system blowdown. Since the need for liquid radwaste discharges and cooling tower blowdown may not coincide, water treatment chemicals were being wasted. Dilution water could be supplied directly from Lake Harris after installation of this new line eliminating the need for circulating water blowdown flow during discharges. This increased dilution water flow would also enable the licensee to increase the liquid radwaste monitors setpoints during discharges (when the monitors are placed back in service).

f. Gaseous Effluent Flow Indicators

The inspector discussed with the licensee the inability to measure flow through three out of four gaseous effluent stacks. Installed in the stacks were multisensor hotwire anemometer systems to measure flowrates through the stacks to the environment. Calibration complexities associated with this type of multisensor system along with turbulent flow problems in the stacks had prevented the licensee's successful use of this system.

Previous flow modifications within the stacks (baffles) had been unsuccessful in resolving turbulence problems.

This had placed the licensee in continuous ACTION statements of the Technical Specifications requiring periodic flow rate estimations once per four hours when the flow rate instruments were inoperable. At the time of this inspection the licensee was evaluating a long

term resolution to this problem. This matter will be followed as an IFI (50-400/88-24-02).

g. Energy and Environmental Laboratories

The inspector toured the laboratories at the Harris Energy and Environmental Center located near the plant site and held general familiarization discussions with licensee personnel working at the center.

Duties performed by laboratory personnel related to liquid and gaseous effluents included the following:

(1) Technical Specifications required analyses of Strontium 89/90 on gaseous effluent sample filters, and strontium-89/90 and Iron-55 analyses on composited liquid effluent samples for all Carolina Power and Light (CP&L) nuclear facilities (Harris, Brunswick 1 and 2, Robinson).

(2) Analyses of environmental thermoluminescent dosimeters (TLDs) for all CP&L sites and participation in a quality control program with all sites for personnel dosimetry.

(3) Environmental sample analyses for all CP&L sites including sample collection for the Harris site.

The laboratories contained a various array of gamma spectroscopic, alpha/beta proportional counting, and liquid scintillation counting capabilities. This included a mobile laboratory that was maintained for emergency purposes and for use during emergency drills at all sites.

No violations or deviations were identified.

3. Counting Room/Quality Assurance (84725)

a. The inspector toured the radiochemical count room and noted the following equipment:

° Canberra Series 90 Gamma Spectroscopy System with four intrinsic germanium detectors used for site gamma spectroscopy analyses.

° Packard Model 4530 Liquid Scintillation System used for Tritium (H-3) analyses.

° Two Tennelec LB5100, Series II, proportional counting systems used for alpha and beta radioactivity analyses.

All of the above equipment appeared well maintained and in working order.

b. The licensee's quality assurance program was reviewed by the inspector to ensure compliance with selected portions of Regulatory Guide 4.15, Quality Assurance for Radiochemical Monitoring Programs (Normal Operations) - Effluent Streams and the Environment, Rev. 1, 1978. The following observations were made.

- Daily quality control checks on the gamma spectroscopy system were performed with a Europium-152 gamma source. Energies, resolution values, and intensities of key energy values (121.8 KeV and 1408 KeV) were recorded and trended with specified predetermined control limits in order to verify stability and system operability between efficiency calibrations.

One item of concern was noted in this area. Temperature transients in the counting room due to HVAC deficiencies had caused obvious effects on the performance of the gamma spectroscopy system, placing daily quality control checks out of their predetermined control limits. This subsequently had placed some of the detectors out-of-service until proper cooling could be returned to the counting laboratory. Although periodic quality control checks appeared to monitor these transients, the potential did exist for inaccurate gamma spectroscopy measurements.

- Efficiency calibration of the gamma spectroscopy system were performed yearly for all geometries.

- The licensee participated with an outside vendor in an extensive split sample program. Cross-check samples were being analyzed for all geometries on a quarterly basis.

- Technical Specification required analyses of composited effluent samples for Iron-55 and Strontium-89/90 were performed at the Harris Energy Center. This group performed these analyses for all Carolina Power and Light Nuclear Facilities.

- All efficiency data records, calibration source certificates, and the records associated with the count room were easily accessible and well organized.

- Daily plots of background and efficiency checks for the alpha/beta proportional counting system and the liquid scintillation counting system were reviewed by the inspector. Systems operability appeared very stable and no items of concern were noted.

The inspector selectively reviewed portions of the following procedures associated with the count room:

- RCP-701, Operation of the Canberra Series 90 Gamma Spectroscopy System, Revision 3, May 26, 1988

- RCP 702, Calibration of the Canberra Series 90 Gamma Spectroscopy System, Revision 0, November 25, 1986
- RCP-710, Operation of the Packard Model 4530 Liquid Scintillation Counting system, Revision 2, May 13, 1987
- RCP-720, Operation of the Tennelec LB5100, Series II, Proportional Counting System, Revision 3, December 16, 1987

These procedures were concise, complete and easy to follow.

No violations or deviations were identified.

4. Collection of Collocated TLD Measurement Results (Temporary Instruction (TI) 2500/22)

This TI requires the collection of State and licensee environmental thermoluminescent dosimeter (TLD) measurement results from monitoring locations collocated with NRC TLD locations. This information was collected by the inspector to be forwarded to the appropriate NRC personnel.

5. Followup of Information Notices (92701)

a. Information Notice (IN) 88-22, Disposal of sludge from onsite sewage treatment facilities, had been received by the licensee, reviewed for applicability and distributed to the appropriate plant personnel for action.

Samples of sewage treatment sludge were being analyzed for radioactivity prior to removal from the sewage treatment system. If the sludge did not contain licensed material it was transported by a contractor to a local (Fuqua-Varina) municipal sewage plant. This item is considered closed.

b. IN 88-31, Steam Generator Tube Rupture Analysis Deficiency, had been received by the licensee, reviewed for applicability and distributed to the appropriate plant personnel for action.

Prior to this inspection, the licensee and Westinghouse had recently redone the Shearon Harris Nuclear Power Plant Steam Generator Tube Rupture Analysis, in which the potential for steam generator tube uncovery was specifically addressed. This item is considered closed.

No violations or deviations were identified.

6. Action On Previous Inspection Findings (92701)

a. (Closed) Inspector Followup Item (IFI) 50-400/87-13-05: Review delayed preoperational testing of the radwaste solidification system.

At the time of this inspection, the licensee indicated no current plans to operate the fluidized bed dryer system to solidify radwaste. This item is, therefore, considered closed.

b. (Closed) IFI 50-400/87-13-06: Review installation and testing of modified computer software in the radiation monitoring system.

As discussed in Inspection Report No. 87-25, improvements in the general operating condition of the radiation monitoring system had occurred; however, problems with overloading the system with data messages continued to occur. This problem was finally attributed to a buffer message deallocation problem. Software modifications were made by the vendor and after six months no repeat problems had occurred.

At the time of this inspection, the source code for the radiation monitoring system computer was being certified administratively on-site through the licensee's QA/QC program. This item is considered closed.

c. (Closed) IFI 50-400/87-25-01: Review licensee actions to replace monitor for inline detection of dissolved gases in RCS samples and resolve accuracy of grab sample analysis.

As discussed in Inspection Report No. 87-25, discrepancies were observed in dissolved hydrogen and isotopic activity results between the post accident sampling system (PASS) stripped gas samples and normal reactor coolant system (RCS) samples. These discrepancies prevented the licensee from meeting NUREG-0737,II.B.3 requirements for quantification of dissolved gases in the RCS.

After intense evaluation and testing, the licensee concluded that the discrepancies were caused by the following:

(1) Erroneous stripped gas flow indications during gas grab sampling from the PASS caused by a flow indicator malfunction.

(2) Incorrect assumption that dissolved hydrogen and entrained fission gases were stripped from a liquid sample in the PASS with the same efficiency (74%).

At the time of this inspection, the cause of the flow indicator malfunction was not established. The licensee could, however, obtain correct gas flow readings by directing sample flow through the hydrogen analyzer.

Gas stripping efficiency for fission gases was recalculated to be 28%, which is different from dissolved hydrogen. This figure was reconfirmed empirically through actual system testing and sampling. Test data also reconfirmed the original assumption of 74% for dissolved hydrogen stripping efficiency.

Later comparisons between PASS and normal RCS samples analyzed on May 27, 1988, showed good agreement and met NUREG-0737 criteria for PASS stripped gas analysis. This item is considered closed.

d. (Closed) IFI 50-400/87-25-02: Review licensee resolution of contamination of PASS RCS samples with chloride.

As discussed in Inspection Report No. 87-25, discrepancies were observed in chloride ion concentrations between three diluted PASS RCS samples and a normal undiluted RCS sample indicating the presence of chloride contamination in the PASS. These discrepancies prevented the licensee from meeting NUREG-0737,II.B.3 requirements for quantification of chloride in the RCS.

After an investigation, it appeared to the licensee that the chloride contamination was the result of a high chloride thread sealant used in a 4-way liquid dilution valve in the PASS. To correct the contamination problem the dilution valve was replaced. Tests completed after the replacement indicated no chloride contamination. New dilution factors for the valve were to be established during the refueling outage which was occurring during the time of this inspection. This item is considered closed.

No violations or deviations were identified.

7. Exit Interview

The inspection scope and results were summarized on August 19, 1988, with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results. Proprietary information is not contained in this report.

Attention was brought to a pressurizer spray line valve that had been leaking primary coolant (Paragraph 7). Management indicated they were aware of the problem and had initiated corrective actions to fix the valve.

ATTACHMENT

SHEARON HARRIS

SEMIANNUAL EFFLUENT SUMMARY

	1987
No. Abnormal Releases	
a. Liquid	0
b. Gaseous	0
Liquid Waste Released (gallons)	1.83E+07
Activity Released (Curies)	
a. Liquid	
1. Fission and Activation Products	9.08 E-1
2. Tritium	2.48 E+2
3. Gross Alpha	2.73 E-4
b. Gaseous	
1. Noble Gas	1.71 E+3
2. Halogens	0.00 E+0
3. Tritium	0.00 E+0
4. Gross Alpha	3.15 E-6
5. Particulate (gross beta/gamma)	4.43 E-6